

Special call: *Tourism and Covid-19*

Effects of the COVID-19 pandemic on tourism in Fernando de Noronha in the first semester of 2020.

Efeitos da pandemia do COVID-19 sobre o turismo em Fernando de Noronha ao longo do primeiro semestre de 2020.

Efectos de la pandemia de COVID-19 sobre el turismo en Fernando de Noronha durante el primer semestre de 2020.

Wilma Barros da Paixão¹; Itamar José Dias e Cordeiro¹; Nathália Körössy Leite¹

¹Federal University of Pernambuco (UFPE), Recife, PE, Brazil.

Keywords:

Coronavirus;
COVID-19;
Tourism;
Fernando de Noronha.

Palavras-chave:

Coronavírus;
COVID-19;
Turismo;
Fernando de Noronha.

Abstract

The Coronavirus COVID-19 unleashed an unprecedented global crisis. Effects of the pandemic have been (and are still being) felt in all sectors of the economy. This was especially true in tourism, where operations have almost completely shut down after March, changing the sector's prospects that appeared so good in early 2020. This paper analyzes the repercussions of this crisis in Fernando de Noronha (state of Pernambuco, Brazil), estimating the changes in visitation and revenue. For that end, we have assessed data from Brazilian and international official sources encompassing the months of January to June, 2020. The findings show that public power failed to take action during the early stages of the pandemic in the archipelago. Also, a decrease in revenue of over 35% was identified in comparison with the first six months of 2019. We have also noted that the archipelago is far from obtaining the estimated revenue, which may impact the provision of essential services for the population.

Resumo

O Coronavírus COVID-19 desencadeou uma crise global sem precedentes. Os efeitos da pandemia foram (e ainda são) sentidos em todos os setores da economia. Particularmente no turismo, o que se viu foi uma quase total paralização de suas operações a partir de março que mudou as boas perspectivas que o setor apresentava no início de 2020. O presente estudo objetivou analisar as repercussões desta crise em Fernando de Noronha (Pernambuco), estimando as alterações provocadas na visitação e na arrecadação. Para tanto, foram analisados dados obtidos em fontes oficiais nacionais e internacionais relativos ao período de janeiro a junho de 2020. Os resultados evidenciam a inércia do poder público quanto à adoção de providências nos primeiros momentos da pandemia no arquipélago. Além disso, foi identificada uma queda de mais de 35% na arrecadação em comparação aos primeiros seis meses de 2019. Observou-se ainda que o arquipélago está longe de arrecadar os valores previstos, o que pode repercutir na prestação de serviços básicos à população.

Palabras clave:

Coronavirus;
 COVID-19;
 Turismo;
 Fernando de Noronha.

Peer-reviewed article.

Received in: 23/07/2020.

Approved in: 30/09/2020.

Editor:

Glauber Eduardo de Oliveira Santos.

**Resumen**

El Coronavirus COVID-19 provocó una crisis mundial sin precedentes. Los efectos de la pandemia se sintieron en todos los sectores de la economía. Particularmente en turismo, lo que se vio fue una parálisis casi completa de sus operaciones desde marzo que cambió las buenas perspectivas que el sector presentó a principios de 2020. El presente estudio tuvo como objetivo analizar las repercusiones de esta crisis en Fernando de Noronha (Pernambuco), estimando los cambios causados en las visitas y en la recaudación. Con este fin, se analizaron los datos obtenidos de fuentes oficiales nacionales e internacionales para el período de enero a junio de 2020. Los resultados apuntan para la inercia de las autoridades públicas con respecto a la adopción de medidas en los primeros momentos de la pandemia en el archipiélago. Además, se identificó una caída de más del 35% en los ingresos en comparación con los primeros seis meses de 2019. También se observó que el archipiélago está lejos de recoger los valores esperados, lo que puede tener repercusiones en la prestación de servicios básicos a la población.

How to cite: Paixão, W. B.; Cordeiro, I. J. D.; Leite, N. K. (2021). Effects of the COVID-19 pandemic on tourism in Fernando de Noronha in the first semester of 2020. *Revista Brasileira de Pesquisa em Turismo*, São Paulo, 15 (1), 2128. <http://dx.doi.org/10.7784/rbtur.v15i1.2128>

1 INTRODUCTION

The year 2020 will be remembered by the abrupt changes caused by the new Coronavirus pandemic (COVID-19). Just a few months after the first cases, reported still in 2019 (Hua & Shaw, 2020), millions of people had been infected, tens of thousands had died, and thus the new Coronavirus managed to alter routines and dynamics everywhere, forcing the implementation of social distancing measures in order to curb the spread of the virus and avoid the overload of health care systems in the world's greatest economies – and destinations (Lippi, Sanchis-Gomar & Henry, 2020; Verelst, Kuylen, & Beutels, 2020). With travel restrictions enforced in several countries (Gössling, Scott, & Hall, 2020), by late April 2020, 100% of the world's tourist destinations experienced such restrictions (UNWTO, 2020a), and even the World Tourism Organization (UNWTO) campaigned for the postponement of travel plans (Pololikashvili, 2020).

According to *FlightRadar*, an organization that has been providing data on world aviation since 2006, the number of commercial flights, which had been decreasing since February (-4.3%) and March (-27.7%), experienced a reduction of more than 70% in the months of April (-73.7%) and May (-70.8%), with a slight recovery in June (-62%), when compared with the same periods of 2019 (Petchenik, 2020a, 2020b, 2020c).

With airspace closures, the interruption of activities in tourist attractions and banned access to beaches and parks (Baum & Hai, 2020), UNWTO estimates a 60 to 80% decrease in the number of foreign visitors in 2020 when compared with 2019. Moreover, efforts towards the UN's Sustainable Development Goals are expected to regress (UNWTO, 2020b). The WTTC (2020) estimates that this crisis jeopardizes over 75 million jobs. Those who have tourism as their main economic activity were left in a particularly vulnerable situation, since their income disappeared almost immediately (Botero et al., 2020). Although every kind of destination suffered the consequences, one particular kind is worthy of special attention: islands.

Conditioned by their distance from the continent, by their relatively smaller size, their reduced population and their not too robust economic potential (due to restrictions of space and resources), small islands are in a delicate situation in terms of prospects for economic development (UNWTO, 2004; UNWTO & UNEP, 2000; Briguglio & Briguglio, 1996; Briguglio, 1995). Such characteristics make tourism virtually the only option left for these places (UNWTO, 2004; Briguglio; Briguglio, 1996; Kokkranikal, McLellan, & Baum, 2003; Brown & Cave, 2010), as exemplified by cases such as Aruba, Curaçao, Bonaire, Margarita Island, Antigua, Barbuda, Guadalupe, Dominica, Martinica, Ibiza, Bahamas, Cozumel, Puerto Rico, Azores, Sal, Madeira, Canary, Seychelles, Fiji, Tahiti, Easter Island, Galapagos, among so many others (Körössy, 2007; Apostolopoulos & Gayle, 2002).

Studies such as Dwyer and Forsyth (1997), Marques, Logossah and Carpin (2003), Dwyer, Forsyth and Spurr (2004) on the economic impact of tourism in small insular economies show that tourism represents, in the words of Sousa (2006, p.45), “the driving force behind the economy of small islands”. Hampton and Christensen (2007), for instance, estimate that the contribution of this activity for the GDP of insular destinations amounts to 20 to 50%, while, according to the UNWTO (*apud* Hassan, Scholes, & Ash, 2005), the proportion may be even higher, as in the cases of the Maldives (57.3%), Anguilla (65.1%), and Cayman Islands (71.7%). In Brazil, one of the best reflections of an insular destination's dependency on tourism is, probably, Fernando de Noronha.

The Archipelago of Fernando de Noronha is located four degrees below the Equator (3° 54'S latitude, 32° 25'W longitude), and 339 miles from Recife (PE), 224 miles from Natal (RN) and 441 miles from Fortaleza (CE). Because of its status as a Conservation Unit, thus submitted to a special protection regime (limiting activities to be held in the Archipelago), tourism became the only viable economic activity, and 95% of the population depend on it.

The Archipelago's health care system consists of a single unit, the São Lucas Hospital, serving both the population and its visitors, rated as a medium complexity facility, with 10 inpatient beds, one surgery room, one delivery room and a dental office (Fernando de Noronha, 2013). It should be noted that, during the development of the Management Plan for the Environmental Conservation Area of Fernando de Noronha, 36% of the population mentioned health care as the Island's main problem (IBAMA, 2004).

Since the early 1990s, when Fernando de Noronha was opened to tourism, the influx of visitors has been growing steadily (Figure 1). Observing the number of tourists that reach the island by air, we note that over the first 10 years of tourism (1991-2001), the annual average was slightly over 26 thousand people/year. Over the following 10-year period (1992-2002), the annual average number of visitors was over 56 thousand, that is, more than doubled (Cordeiro, 2016). Between 2013 and 2018, the annual average was over 86 thousand people (Pernambuco State Government, 2018). The year of 2019 recorded the largest number of visitors in the history of tourism in the Archipelago: 106,130 tourists, 92% of them domestic and 8% from abroad (Diário de Pernambuco, 2020).

Figure 1 – Evolution of tourist flow by air (1991-2018)



No data is available for the year 1993

Source: Adapted from Cordeiro (2016); Pernambuco State Government (2018).

The average length of stay in the island has been, since 2016, of around 5 days. Most domestic visitors (45%) come from the Southeast region (especially São Paulo), while most foreign visitors (47%) come from Europe, particularly Italy and France (Diário de Pernambuco, 2020).

The importance of tourism in Fernando de Noronha is also demonstrated by the growth in the number of inns: between 1965 and 1988 there were only 7 inns in the island; from 1988 to 1995, 27 new inns appear; between 1996 and 2010, 38 inns are established, and between 2011 and 2016, 2 more appear (Cordeiro, 2016). According to the Ministry of Tourism (2017), the island's average occupation rate in 2016 was 91%. As for its population, the number of inhabitants in Fernando de Noronha (including permanent and temporary

residents) went from 1,241 in 1970 to circa 2,630 in 2010, and is estimated to be at around 3,101 people in 2020, with a population density of 154.55 inhabitants/km² (IBGE, 2020).

Fernando de Noronha has 16 beaches and bays spread throughout its territory, and a historic heritage comprised of the architectural ensemble of Vila dos Remédios, Vila da Quixaba, as well as the largest defense system built by the Portuguese in the eighteenth century. The demands of tourism are met by over 90 inns, 35 bars and restaurants and 12 companies specializing in tourist reception, diving, and expeditions (Governo de Pernambuco, 2016).

Thus, since it was closed for visitation, on March 17, 2020 (Marinho, 2020b), due to the pandemic caused by the new Coronavirus, the Archipelago lost its population's main source of jobs and income.

At the time when the Archipelago was closed for visitation, the world counted around 180 thousand cases and 7 thousand deaths by the new Coronavirus (WHO, 2020f), and since then it has been left without tourism, its main economic activity (Rocha & Brasileiro, 2013; Souza & Vieira Filho, 2011). Moreover, the absence of visitors affects public tax revenues, since the charge of an Environmental Conservation Fee (Taxa de Preservação Ambiental - TPA, enacted by Law 10.403, of December 29, 1989) is a major source of tax revenue for the Archipelago's administration (Cleto, 2013; Cordeiro, 2016; Cordeiro, Korossy & Tôrres, 2019). To make matters worse, Fernando de Noronha's lockdown (Fernando de Noronha, 2020q) decreased the spending of families, putting an even greater strain on local tax revenues. In view of all this, let us assess the situation of Fernando de Noronha.

Considering the repercussions of the pandemic on a sector that is the Archipelago's economic mainstay, this paper aims to assess the impact of the crisis caused by the Coronavirus pandemic in Fernando de Noronha (Pernambuco), estimating the changes in visitation and revenue. For that end, three specific goals were set:

- I. Surveying the events and reactions that took place in the Archipelago from the acknowledgement of the virus' existence (on December 31, 2019) to the end of the first semester of 2020;
- II. Identifying the changes in visitation to the Archipelago caused by the establishment of a quarantine;
- III. Estimating the pandemic-induced loss of revenue for the Archipelago's administration.

Besides the introduction, which correlates the pandemic and tourism, particularly in insular destinations, this paper is structured as follows: one section on the methodological procedures employed, followed by a section on the results of the research, and another section presenting considerations regarding the study.

2 METHODOLOGICAL PROCEDURES

This was an exploratory-descriptive research, with basic statistic treatment of the data obtained. Answering Goal 1 resulted in the creation of a **timeline**, in which we attempted to correlate the main pieces of information on the disease, as publicized (inter)nationally, with news stories published about the Archipelago. For that end:

- Worldwide information was obtained through the World Health Organization (WHO) website, considering the situational reports published daily on the disease since January 21, 2020 (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>). Additionally, we have consulted reports and announcements published by the UNWTO (<https://www.unwto.org/covid-19-highlights>);
- Information on Brazil was collected in epidemiological bulletins (<https://www.saude.gov.br/boletins-epidemiologicos>) and news pieces (<https://www.saude.gov.br/noticias/agencia-saude>) published by the country's Ministry of Health;
- Information on Fernando de Noronha was obtained in the Archipelago's official website, at the page "Acontece em Noronha" (<http://www.noronha.pe.gov.br/comAcontece.php>). An additional search involved the journalistic blog Viver em Noronha, within Rede Globo's web portal G1

(<https://g1.globo.com/pe/peernambuco/blog/viver-noronha>). We have also consulted the State Government of Pernambuco's news blog (<http://www.pe.gov.br/blog>) to verify topics, particularly those related to legislation, with implications for the Archipelago.

In order to identify the pandemic's effects on visitation to the Archipelago (Goal 2), we consulted:

- The time series of the number of flights between the months of January to June, from 2012 to 2020. This information was obtained through the National Civil Aviation Agency, in its Flight History (<https://www.anac.gov.br/assuntos/dados-e-estatisticas/historico-de-voos>). Within these documents, a search for flights to the Fernando de Noronha airport, code SBFN allowed us to collect information on such flights.
- Revenue data for the State District of Fernando de Noronha, obtained through Pernambuco's Transparency Portal (<http://web.transparencia.pe.gov.br/receitas>). For the effects of this study, the following data were observed for the years of 2012 to 2020:
 - "Total Revenues" as estimated in Fernando de Noronha District's annual budget.
 - Sum of "Total Revenues" over 12 months of each year.
 - Sum of "Total Revenues" from January to June.
 - Revenue in the category "Fees": This indicator had to be followed because of the Environmental Preservation Fee charged by the administration of Fernando de Noronha, according to Law 10,043 of December 29, 1989, with the purpose of ensuring the maintenance of the Archipelago's environmental and ecological conditions (Pernambuco, 1989). From 2012 to 2018, this category was included in "Tax Revenues" (Grand Total > Tax Revenues > Fees), but as of January 1, 2019, Pernambuco adopted a new system for the classification of public expenses, through Ordinance SEPLAG 69, of October 9, 2019, wherein the category "Fees" was moved from "Tax Revenues" to "Taxes, fees and contributions for improvements" (Grand Total > Taxes, fees and contributions for improvements > Fees) (SEPLAG, 2020).
 - Sum of "Fees" over the 12 months of each year.
 - Sum of "Fees" from January to June.

We chose 2012 as the first year of the time series because this was the first year in which the Law of Access to Information (November 18, 2011) was fully regulated (Brazil, 2011), making the material more reliable. The months of January to June of each year were considered, because these were the months of 2020 available by the time of the research. Excel was the tool used to help with the statistical treatment.

Finally, the estimated loss of revenue caused by the pandemic for the Archipelago's Administration (Goal 3) was calculated through an analysis of the expenses foreseen in the Annual Budget Bill (Lei Orçamentária Anual - LOA) (<http://web.transparencia.pe.gov.br/planejamento-orcamento/lei-orcamentaria-anual-loa>) for the District of Fernando de Noronha in 2020.

3 RESULTS AND DISCUSSION

This research has collected information in order to map the evolution of the new Coronavirus in Fernando de Noronha as well as the responses offered by the Archipelago's public management (Box 1).

This survey shows that, over the first two and a half months of the year, when the gravity of the situation was confirmed (through the Declaration of Public Health Emergency in Brazil or even through the classification of the new Coronavirus as a pandemic by the WHO), Fernando de Noronha was not (like the rest of Brazil also was not) concerned with the adoption of confrontation measures. As of the first half of March, the arrival of tourists to the Archipelago had not been affected by the disease. Even with the declaration of a National Public Health Emergency and the detection of the first case of the virus in Brazil in February, Fernando de Noronha maintained Carnival celebrations. By March 11, 2020, when the virus was classified as a pandemic, for instance, preparations for the surfing event to be held the following week were going on normally.

Box 1 - Time line of main events in the first six months after the appearance of the new Coronavirus (Brazil and World x Fernando de Noronha). (continue)

DATE	BRAZIL AND WORLD	FERNANDO DE NORONHA
12/31/2019	First cases of the new Coronavirus in China (WHO, 2020m), still without any official announcements by the World Health Organization (WHO, 2020a).	Fernando de Noronha celebrates New Year's Eve, with a great influx of tourists (Fernando de Noronha, 2019).
01/13/2020	First reported case of the new Coronavirus outside of China (WHO, 2020q)	The Administration of Fernando de Noronha presents a financial overview of the year 2019 (Fernando de Noronha, 2020f).
02/03/2020	With the confirmation of the virus' transmission between humans (WHO, 2020n) and the declaration of a Public Health Emergency of International Concern (WHO, 2020o), a Public Health Emergency is declared in Brazil (Brazil, 2020).	Fernando de Noronha plans for Carnival, and a few days later releases its schedule (Fernando de Noronha, 2020a)
02/26/2020	The first case of the new Coronavirus in Brazil is confirmed (Brasil. Ministry of Health, 2020a).	Tourists and residents celebrate Carnival in Fernando de Noronha (Fernando de Noronha, 2020i)
03/11/2020	The new Coronavirus is classified as a pandemic (WHO, 2020e)	Fernando de Noronha is preparing to host a Surf Circuit between March 19 and 22 (Fernando de Noronha, 2020n)
03/15/2020	UNWTO issues a warning for responsible travel (UNWTO, 2020c)	The Administration of Fernando de Noronha postpones public events (Marinho, 2020a)
03/16/2020	The world counts more than 160 thousand cases and 6 thousand deaths by the new Coronavirus (WHO, 2020d)	Fernando de Noronha's health care professionals receive training on the new Coronavirus (Fernando de Noronha, 2020u)
03/17/2020	UNWTO's Secretary-General makes a statement in favor of travel restrictions (Pololikashvili, 2020)	Fernando de Noronha's National Marine Park is closed for visitors, and arrivals and departures at the airport are suspended as of March 21, 2020 (Marinho, 2020b; 2020b; <i>Decreto 48.882 de 17 de Março de 2020</i> , 2020)
03/25/2020	Tokyo 2020 Olympic Games are postponed to 2021 (Tokyo 2020, 2020)	Fernando de Noronha launches a contingency plan to fight the new Coronavirus, hiring health care professionals and purchasing materials (Fernando de Noronha, 2020m); A 14-day quarantine is established for those arriving from the continent (Fernando de Noronha, 2020k)
03/27/2020	An online meeting brings together the leaders of the world's 20 greatest economies (G20) to discuss strategies and actions against the new Coronavirus (WHO, 2020p)	Fernando de Noronha confirms the first case of the new Coronavirus (Fernando de Noronha, 2020p)
04/02/2020	WHO warns against medications and products offering false claims of cure for the Coronavirus (WHO, 2020g). The world counts over 35 thousand deaths by the new Coronavirus (WHO, 2020c)	The Justice Court of Pernambuco determines the removal of irregular residents from Fernando de Noronha (Marinho, 2020e); Works begin for the construction of a field hospital (Fernando de Noronha, 2020s)
04/10/2020	The new Coronavirus pandemic completes 100 days with almost 1.5 million infected and 85 thousand deaths (WHO, 2020h); WHO recommends the use of masks for the whole world's population (WHO, 2020b)	The Administration of Fernando de Noronha launches an online psychological treatment program and distributes basic food baskets to the population (Fernando de Noronha, 2020l, 2020o); Residents have trouble purchasing food because of the reduced frequency of boats from the continent (Marinho, 2020f)
04/16/2020	Health Minister Luiz Henrique Mandetta is fired (Brazil. Ministry of Health, 2020b) because of disputes with President Jair Bolsonaro over strategies for confronting the pandemic in Brazil (Shalders, 2020)	State Government decrees mandatory quarantine in Fernando de Noronha (<i>Decreto 48.955 de 16 de Abril de 2020</i> , 2020)
04/28/2020	100% of the world's destinations have some travel restriction in place (UNWTO, 2020a)	The installation of a 6-bed field hospital is completed (Fernando de Noronha, 2020c)
05/09/2020	In Brazil, the number of cases exceeds 150 thousand, with over 10 thousand deaths and circa 60 thousand recoveries (Brasil. Ministério da Saúde, 2020c)	Fernando de Noronha has zero suspected cases of the new Coronavirus (Fernando de Noronha, 2020t) and mandatory quarantine is lifted (<i>Decreto 48.955 de 16 de Abril de 2020</i> , 2020)
05/22/2020	The world approaches 5 million cases of the new Coronavirus (WHO, 2020i)	Administration of Fernando de Noronha begins an epidemiological study to assess the virus' circulation in the Archipelago (Fernando de Noronha, 2020j)

Box 1 - Time line of main events in the first six months after the appearance of the new Coronavirus (Brazil and World x Fernando de Noronha). (Conclusion)

05/24/2020	Brazil is in its third Health Minister during the pandemic, and counts 360 thousand cases and over 22 thousand deaths, with over a thousand deaths registered in 24 hours (Brazil. Ministry of Health, 2020c; WHO, 2020j)	Administration of Fernando de Noronha authorizes the use of beaches (Fernando de Noronha, 2020d), but in reduced hours because of the fauna's possible new habits after the population's changed routines and the absence of tourists (Marinho, 2020d)
05/27/2020	Brazil surpasses Russia and becomes the world's second country in number of cases, only behind the United States (WHO, 2020k)	Unemployment insurance is paid to 48 families (Fernando de Noronha, 2020g)
06/09/2020	An Ordinance by the Pernambuco State Health Secretariat authorizes the return of elective hospital procedures in the state, in a new stage of the flexibilization plan (Pernambuco, 2020c)	Epidemiological study detects 36 cases, and Fernando de Noronha accumulates 64 cases of the disease (Fernando de Noronha, 2020e)
06/12/2020	OECD issues a report on the economic impacts of the new Coronavirus, estimating a global scenario of 6 to 7.6% of decrease (OECD, 2020)	Administration of Fernando de Noronha invites the tourist sector to plan its reopening (no foreseen date) (Fernando de Noronha, 2020b)
06/15/2020	The world approaches 8 million cases of the new Coronavirus. It took 2 months for the world to reach 100 thousand cases; by now, 100 thousand cases are recorded each day (WHO, 2020l)	Fernando de Noronha has zero cases of the disease again (Marinho, 2020c)
06/20/2020	A World Tourism Organization report indicates that 100 to 120 million jobs in tourism are in jeopardy throughout the world (UNWTO, 2020d)	Bars, restaurants, and coffee shops reopen in Fernando de Noronha with a reduced capacity (Fernando de Noronha, 2020h)
06/29/2020	A World Tourism Organization report shows the vulnerability of insular destinations due to travel restrictions caused by the new Coronavirus (UNWTO, 2020e)	Administration of Noronha authorizes weekly flights in the Archipelago (Marinho, 2020g)

Source: The authors, from research data (2020).

The first reaction, involving the cancellation of public events (on March 15), happened after 75 days. Although it is not possible to determine whether the delay in adopting more restrictive measures had any impact on the dissemination of the virus in the Archipelago, the fact is that, even though the new Coronavirus had affected several countries by mid-March, travel to the Archipelago was not significantly reduced.

This situation would not change until March 17, 2020, when the UNWTO takes a stand in favor of travel restrictions. On this date, the Fernando de Noronha Marine National Park is closed for visitation and the Archipelago's airport is closed. No evidence could be found, however, indicating that this decision was influenced by UNWTO's stance. Note that, just a few days earlier, both UNWTO and Fernando de Noronha were still trying to adopt less austere measures on the activity: until March 15, 2020, the Organization was still discussing how to encourage responsible travel, and the Archipelago's administration was considering the cancellation of events.

One of the main measures adopted by the Administration of Fernando de Noronha as regards tourism was the restriction, by mid-March, of the number of flights to the Archipelago (Chart 1).

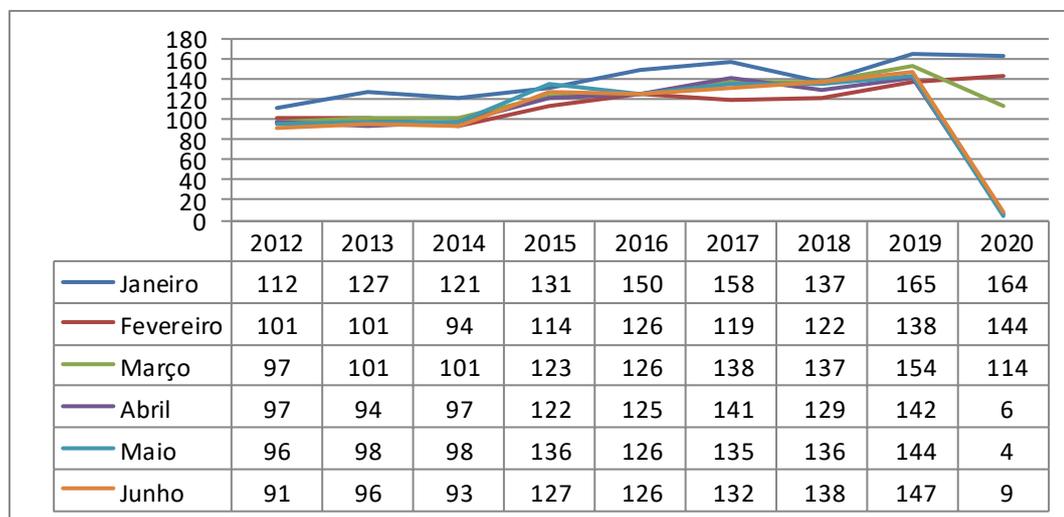
As noted in the observations on the Time Line, Chart 1 shows that in January and February the influx of flights to the Archipelago was normal, when compared with the previous years – in both months the numbers were close to or higher than the peak of flights in the recorded period. By March, however, the number starts to drop, reaching the lowest result since 2014, and 26% lower than the number of flights over the same period in 2019. This number follows a global trend since, as we have seen, in March 2020 commercial flights were reduced by 27.7% in relation to the same month of 2019 (Petchenik, 2020b).

The month of March was decisive in actions against the new Coronavirus, and by the end of the month the contingency plan to combat the virus in the Archipelago is launched. A few days later, the first case of the new Coronavirus in the island was confirmed, but the field hospital for the treatment of the ill would not be completed for another month, indicating gaps in planning for the contingency of the disease.

In April, social vulnerability in the Archipelago, which had always existed, but was obfuscated by the image of a “tourist paradise”, became evident. Problems such as food scarcity and the irregular situation of many of the island's residents came to the fore. Meanwhile, the pandemic continued to advance worldwide, and although 100% of the world's tourist destinations had travel restrictions in place, the decrease in the number

of flights to Fernando de Noronha surpassed the global average of 73.7%. In April 2020, the Fernando de Noronha Airport received only 6 flights, a reduction of around 95% in relation to previous years, a collapse that was influenced by the mandatory quarantine enforced in the Archipelago by late April.

Chart 1 - Time series (2012: 2020) of the number of flights towards the Fernando de Noronha Airport in the months of January to June



Source: The authors, from ANAC data (2020).

In May, although isolation measures had been loosened and no new cases had been recorded, arrivals by air remained low. Once more surpassing the global average in reduction of the number of flights, the Fernando de Noronha Airport receives no more than 4 flights. June maintains the same trend of steep decrease in the number of flights to the Archipelago, although with a slight recovery from the previous month: 9 flights were received.

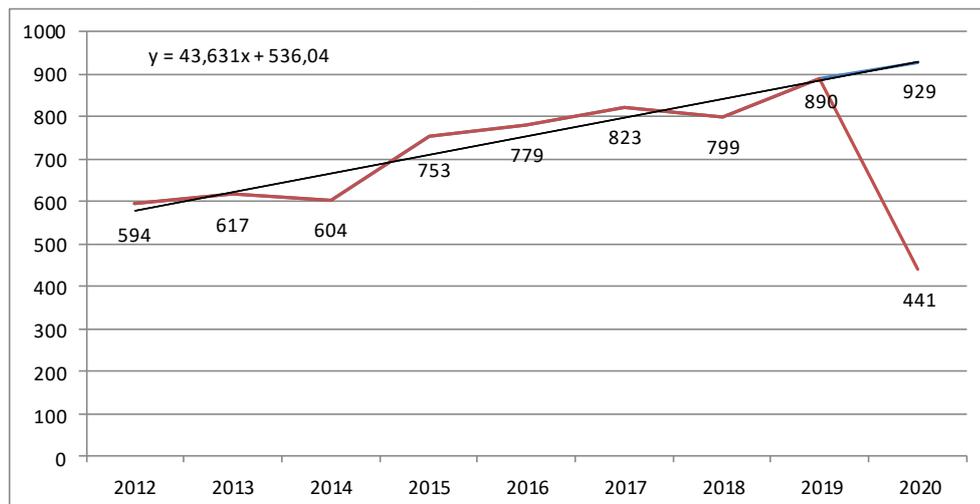
Chart 2 shows the estimated decrease in the number of flights from January to June 2020, by applying the equation calculated for the trend line, with $x = 9$ (2020 is the ninth year of the sequence). In the chart, the red line corresponds to the total of flights and the blue line represents the trend calculated for the number of flights in 2020, had there not been the new Coronavirus pandemic. Estimates indicate that, because of the disease, the Archipelago of Fernando de Noronha failed to receive 488 flights in the first six months of 2020.

May was a politically tense month, nation-wide, with the exit of the second Minister of Health during the pandemic. In the same month, Brazil becomes the world's second country in number of cases.

Then, the month of June is marked by the consolidation of loosened isolation measures in the Archipelago of Fernando de Noronha, as well as in other municipalities of Pernambuco. An epidemiological study conducted in the Archipelago, however, shows that the place was not rid of the disease, even though no new cases had been recorded. In this month, the new Coronavirus continued to advance in Brazil and worldwide. A UNWTO report (UNWTO, 2020d, 2020e) indicated job losses and greater poverty, particularly in insular destinations; while OECD estimated major economic losses worldwide (OECD, 2020).

In the second semester of 2020, with the decrease in the number of new recorded cases in the Archipelago and in the State of Pernambuco, a new stage began with further loosening of isolation measures, and tourism in Fernando de Noronha was resumed on September 1, 2020. In this first stage, only people who had already been infected by the new Coronavirus could land in the Archipelago, according to the protocol established by local health authorities (Fernando de Noronha, 2020r).

Chart 2 - Time series (2012: 2020) of the sum total of flights towards the Fernando de Noronha Airport from January to June, and linear trend line for flights in 2020.



Source: The authors, from ANAC data (2020).

In fact, although it was relatively successful in curbing the spread of the virus, economic and social impacts in Fernando de Noronha are evident. An analysis of Revenue data as foreseen in the Annual Budget Bill (Lei Orçamentária Anual - LOA) shows how the epidemic altered the State District's fiscal planning (Table 1).

Table 1 - Time series (2012:2020) for Fernando de Noronha District's revenue

YEAR	District Revenue as foreseen in LOA (R\$)	District Revenue in Year (R\$)	District Revenue January to June (R\$)	District Revenue January to June in Relation to LOA (%)	Yearly Fee (R\$)	Yearly Fee in Relation to LOA (%)	Fee January to June (R\$)	Fee January to June in Relation to LOA (%)
2012	33,970,800.00	19,612,440.35	10,958,195.05	32.3	11,765,144.70	34.6	6,049,599.79	17.8
2013	39,679,000.00	19,146,563.27	8,596,187.18	21.7	12,868,707.70	32.4	5,710,241.77	14.4
2014	23,163,700.00	22,317,066.51	10,112,629.49	43.7	15,833,171.12	68.4	7,332,596.1	31.6
2015	19,395,400.00	27,406,732.26	12,525,784.71	64.6	21,188,764.02	109.2	9,580,673.66	49.4
2016	30,887,000.00	32,931,067.31	14,569,152.44	47.2	25,280,714.06	81.8	11,237,832.74	36.4
2017	34,617,100.00	40,989,609.58	20,037,989.53	57.9	30,841,974.26	89.1	14,524,397.59	42.0
2018	46,336,000.00	45,701,721.38	20,977,277.77	45.3	35,366,359.45	76.3	15,996,559.59	34.5
2019	45,206,800.00	52,521,125.73	24,449,776.08	54.1	41,475,450.67	91.7	18,939,319.19	41.9
2020	58,791,700.00	-	15,700,303.67	26.7	-	-	11,020,918.76	18.7

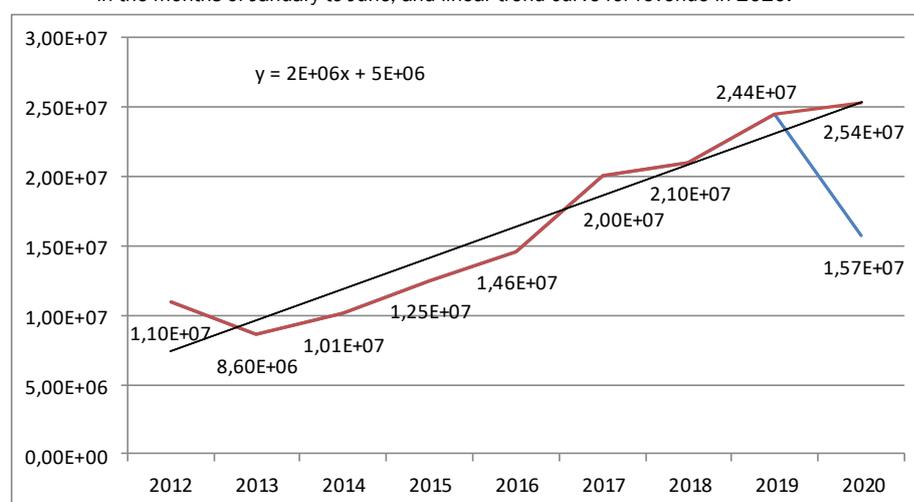
Source: The authors, from data in Pernambuco's Transparency Portal (2020).

Before discussing the results, it is important to note that, according to Pernambuco State's Annual Budget Bill (Pernambuco, 2020a), the District of Fernando de Noronha has two sources of funding: "State Resources", and "Other Resources", provided by the District itself. In general terms, district resources are higher than State resources. In the LOA 2020, for instance, district resources (R\$ 58,791,700.00) were more than twice the state resources (R\$ 27,235,100.00). This is due, mostly, to the Environmental Preservation Fee (here considered as the totality of "Fees"), an important resource for the district's administration, which amounted, from 2012 to 2020, to around 73% of the district's annual revenue. In 2015, incidentally, revenue through Fees was 100% higher than expected, that is, revenues were higher than planned in the LOA.

Another important element of Table 1 refers to District Revenues in relation to LOA between January and June. While, in absolute numbers, district revenue between January and June 2020 is surpassed only by those of 2017, 2018, and 2019, when analyzed in relative terms, the only year in which the expected revenue was farther from the actual revenue than 2020 (26.7%) was 2013 (21.7%). Still, it is evident that the planned budget of 2012 and 2013 was overestimated, with a much lower annual revenue than foreseen in the LOA. Taking as reference only the year 2019, district revenue fell more than 35% just in the first semester of the year.

It is also relevant to note that, as seen, from January to mid-March, all activities in Fernando de Noronha remained as usual, and over these three months the total revenue reached R\$ 13,778,272.59, about 88% of the total observed over the first six months of 2020. Thus, by observing the numbers of district revenue from January to June of each year in the time series of 2012 to 2019, calculating the trend of expected revenue for 2020 and comparing it with the year's actual revenue, one finds an estimated decrease of over R\$ 9.66 million in District revenue over a mere 3.5 months of changed routine, as can be seen in Chart 3, where the red line represents actual numbers and the blue line, the estimate for a scenario with no pandemic.

Chart 3 - Time series (2012:2020) of sum of Total Revenue for the District of Fernando de Noronha in the months of January to June, and linear trend curve for revenue in 2020.



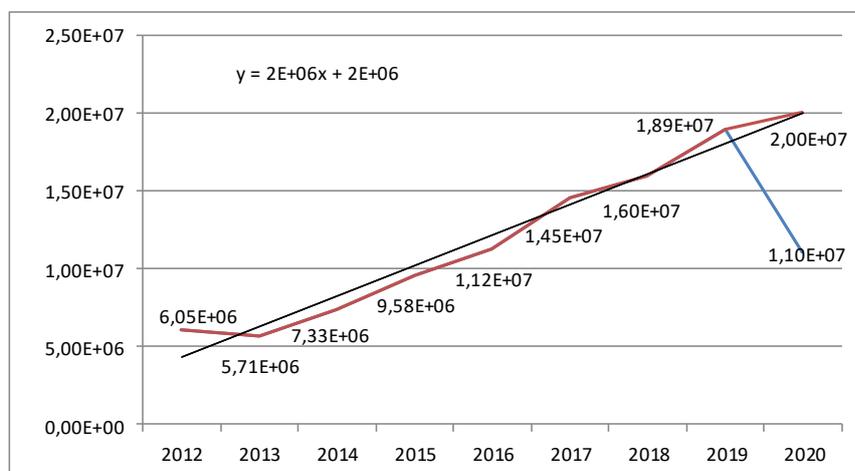
Source: The authors, from data in Pernambuco's Transparency Portal (2020).

According to the analyzed data, then, there is no doubt that there was a significant decrease in the revenue of the District of Fernando de Noronha due to the Coronavirus pandemic, with a drop, in less than 4 months, of about 16% of total revenue in relation to the total value foreseen in the LOA for the year 2020. Still, the decrease in total revenue is due not only to the suspension of tourism activities in the Archipelago, since it was also influenced by the decreased spending of families in view of the mandatory quarantine and the interruption of all non-essential activities in the Archipelago. To assess only the impact in revenue directly associated with the suspension of tourism in Fernando de Noronha, we must adopt a different perspective, and for that end, we resort once again to the category "Fees".

By observing the data in Table 1 and applying, once again, the trend calculation for 2020, using the line formula for the fees collected from 2012 to 2019, the estimated loss of revenue adds up to R\$ 8.94 million

(Chart 4). This value, corresponding to about 93% of revenue decrease in the District of Fernando de Noronha, is, somehow, directly related to the suspension of tourist activities in the Archipelago.

Chart 4 - Time series (2012:2020) of sum of revenue with Fees for the District of Fernando de Noronha in the months of January to June, and linear trend curve for revenue with fees in 2020.



Source: The authors, from data in Pernambuco's Transparency Portal (2020).

Although it is clear that a reduction of almost R\$ 9 million in revenue is not negligible, this research also attempted to understand how this might go beyond the executive sphere and impact in the Archipelago's environmental conservation, in the life of its residents and, later on, in the perception of tourists.

For that end, we had to look once again into the LOA 2020 to obtain information on foreseen expenses for the District of Fernando de Noronha that would be funded with the resources estimated in the Bill. The results, divided into "State Treasury" and "Other Resources", are found in Table 2.

Table 2 - Statement of expenses per project foreseen in the Annual Budget Bill with 2020 resources (continue)

ACTION	STATE TREASURY (R\$)	OTHER RESOURCES (R\$)	TOTAL (R\$)
Public Health Services and Actions Provided by the State District of Fernando de Noronha - DEFN	2,058,200.00	R\$ 0.00	2,058,200.00
Payment of Commuting Allowance and Meal Vouchers to Employees of the State District of Fernando de Noronha	0.00	162,900.00	162,900.00
Conservation of Public Heritage in the State District of Fernando de Noronha	0.00	280,000.00	280,000.00
Construction, Reform and Expansion of Facilities, within the State District of Fernando de Noronha	60,000.00	10,000.00	70,000.00
Employer's Contributions of State District of Fernando de Noronha to FUNAFIN	127,500.00	0.00	127,500.00
Development of Sports- and Leisure-Related Activities in the State District of Fernando de Noronha	0.00	14,500.00	14,500.00
Development of Hospital and Outpatient Assistance in the State District of Fernando de Noronha	0.00	4,461,000.00	4,461,000.00
Development of Basic Health Care in the State District of Fernando de Noronha	0.00	252,400.00	252,400.00
State District of Fernando de Noronha's General Charges	0.00	7,194,100.00	7,194,100.00
Council Funding and Support Within the State District of Fernando de Noronha	0.00	370,000.00	370,000.00
Management of Activities in the State District of Fernando de Noronha	23,438,100.00	26,872,600.00	50,310,700.00
Maintenance of the State District of Fernando de Noronha's Ombudsman Office	0.00	5,000.00	5,000.00
Maintenance of the State District of Fernando de Noronha's Information and Communication Technology	0.00	4,044,100.00	4,044,100.00
Maintenance of Security Operations of the Fernando de Noronha Airport	5,000.00	0.00	5,000.00

Table 2 - Statement of expenses per project foreseen in the Annual Budget Bill with 2020 resources (Conclusion)

ACTION	STATE TREASURY (R\$)	OTHER RESOURCES (R\$)	TOTAL (R\$)
Maintenance of Public Spaces in the State District of Fernando de Noronha	0.00	10,000.00	10,000.00
Urban Service Operations in the State District of Fernando de Noronha	0.00	14,845,700.00	14,845,700.00
Preservation of Historic and Cultural Heritage in the State District of Fernando de Noronha	0.00	14,100.00	14,100.00
Promotion of Social Welfare Actions in the State District of Fernando de Noronha	0.00	250,000.00	250,000.00
Promotion of Sustainable Development in Fernando de Noronha	0.00	5,300.00	5,300.00
Promotion of Elementary and Middle School Education in the State District of Fernando de Noronha	189,600.00	0.00	189,600.00
Promotion of High School Education in the State District of Fernando de Noronha	762,800.00	0.00	762,800.00
Promotion of Pre-School Education in the State District of Fernando de Noronha	588,900.00	0.00	588,900.00
Promotion of Conservation and Sustainable Management of the Fernando de Noronha APA	5,000.00	0.00	5,000.00
Epidemiological and Environmental Vigilance to Control Diseases and Grievances*	0.00	270,114.42	270,114.42
*Actual expense, not foreseen in the LOA			
TOTAL	27,235,100.00	58,791,700.00	86,026,800.00

Source: The authors, from data of the 2020 Annual Budget Bill (Pernambuco, 2020a) and the Pernambuco State Transparency Portal (Pernambuco, 2020b)

The column "Other Resources", corresponding to the District Administration's resources where the previously mentioned impacts were observed, is, as mentioned, the highest foreseen revenue, and therefore it is used to sustain the greatest expenses. Also, in addition to the estimated revenue loss, around R\$ 270 thousand, unforeseen in the LOA, were spent in Epidemiological and Environmental Vigilance for the Control of Diseases and Grievances from the district's resources, between January and June, 2020.

Table 3 shows that, out of 23 actions, only 7 do not require resources from district revenue, mostly corresponding to education in the District; two others use mixed sources of funding; and all others rely exclusively on district revenues, which were deeply impacted by the new Coronavirus crisis. Thus, important actions such as: conservation and preservation of public, historic and cultural heritage; development of sporting and leisure activities; development of hospital and outpatient assistance and basic health care; Information and Communications Technology maintenance; promotion of social welfare actions; and promotion of Fernando de Noronha's sustainable development, may suffer budget cuts, in the short or long term, especially since there is no estimated date for the return of activities, and the implications of the suspension of tourist activities should be felt and amplified for a few more months.

It is essential to note that the greatest of all losses, and the greatest impact to be felt, is social. The new Coronavirus merely revealed problems that had been known to the community already, and with the deterioration caused by the abrupt interruption of the flow of tourists and the consequent loss of work and income for a large part of the population, islanders become particularly vulnerable to the economic and even sanitary threats of pandemic times. Also, as observed, impacts may be felt in hospital assistance and basic health care, social welfare and the development of sporting and leisure activities, all of them directly or indirectly connected with the population's well-being.

4 CONCLUDING REMARKS

This paper aimed at reconstructing the process of arrival and evolution of the new Coronavirus in the Archipelago of Fernando de Noronha throughout the first semester of 2020, as well as its social and economic repercussions in view of the interruption of tourism and social isolation. This reconstruction clearly showed the lag in the Archipelago's capacity of responding to the crisis. Based upon the timing of reaction, it is clear that the Archipelago's public administration was not prepared to deal with the crisis caused by the pandemic.

Furthermore, it shows how vulnerable Fernando de Noronha is to a crisis that affects its demand. Even considering the peculiarities of a sanitary crisis, such as the COVID-19, the episode makes us reflect on the necessity of developing public policy mechanisms that are capable of economically sustaining the local community at times when visitation is interrupted.

As an exploratory study, the present research does not intend to provide answers for Fernando de Noronha's situation. Especially since, as the situation is unpredictable and surprising, any conjecture in that sense would be impracticable. Thus, let us turn back to this paper's goal: to place the situation into context in its initial state, so as to present an image with the initial repercussions of the pandemic on the destination. At the same time, however, we must consider that the situation of isolation makes it impossible to collect data in situ, through interviews with the local community. As such, a diagnosis allowing a proper understanding of the actual extent of social, economic, and ecological consequences of the pandemic in Fernando de Noronha will only be possible once the pandemic ends.

5 ACKNOWLEDGMENT

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001

REFERENCES

- Apostolopoulos, Y., & Gayle, D. J. (2002). *Island Tourism and Sustainable Development: Caribbean, Pacific, and Mediterranean Experiences*. Greenwood Publishing Group.
- Baum, T., & Hai, N. T. T. (2020). Hospitality, tourism, human rights and the impact of COVID-19. *International Journal of Contemporary Hospitality Management*, 1689–1699. <https://doi.org/10.1108/IJCHM-03-2020-0242>
- Botero, C., Mercadé, S., Cabrera, J. A., & Bombana, B. (2020). O Turismo de Sol e Praia no contexto da Covid-19: Cenários e recomendações. In Red Iberoamericana Proplayas.
- Braga, F., Scarpa, G. M., Brando, V. E., Manfê, G., & Zaggia, L. (2020). COVID-19 lockdown measures reveal human impact on water transparency in the Venice Lagoon. *Science of The Total Environment*, 736, 1–7. <https://doi.org/https://doi.org/10.1016/j.scitotenv.2020.139612>
- Brasil. Ministério da Saúde. (2020a). *Brasil confirma primeiro caso da doença*. Agência Saúde. From <https://www.saude.gov.br/noticias/agencia-saude/46435-brasil-confirma-primeiro-caso-de-novo-coronavirus>
- Brasil. Ministério da Saúde. (2020b). *Galeria de Ministros*. From <https://www.saude.gov.br/galeria-de-ministros>
- Brasil. Ministério da Saúde. (2020c). *Painel Coronavírus*. Coronavírus // Brasil. From <https://covid.saude.gov.br/>
- Brasil. Ministério da Saúde. (2020d). Situação epidemiológica da febre amarela no monitoramento 2019/2020. *Boletim Epidemiológico*, 51(1), 1–19. From <https://www.saude.gov.br/images/pdf/2020/janeiro/15/Boletim-epidemiologico-SVS-01.pdf>
- Brasil. Ministério do Turismo. (2017). *Fernando de Noronha registra alta no fluxo turístico em 2016*. Últimas Notícias. from <http://www.turismo.gov.br/ultimas-noticias/7397-fernando-de-noronha-registra-alta-no-fluxo-turistico-em-2016.html>
- Brasil. (2011). Lei Nº 12.527 de 18 de novembro de 2011. *Diário Oficial Da União*. from http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2011/lei/l12527.htm
- Brasil. (2020). *Portaria 188 de 3 de fevereiro de 2020*. Ministro de Estado da Saúde. from <http://www.in.gov.br/en/web/dou/-/portaria-n-188-de-3-de-fevereiro-de-2020-241408388>
- Briguglio, L. (1995). Small island developing states and their economic vulnerabilities. *World Development*, 23(9), 1615–1632. [https://doi.org/10.1016/0305-750X\(95\)00065-K](https://doi.org/10.1016/0305-750X(95)00065-K)
- Briguglio, L., & Briguglio, M. (1996). Sustainable tourism in the Maltese Islands. In *Sustainable tourism in islands & small states: Case studies* (pp. 162–179). from <https://www.um.edu.mt/library/oar/handle/123456789/26739>

- Brown, K. G., & Cave, J. (2010). Island tourism: marketing culture and heritage – editorial introduction to the special issue. *International Journal of Culture, Tourism and Hospitality Research*, 4(2), 87–95. <https://doi.org/10.1108/17506181011045163>
- Cleto, A. (2013). *De cemitério de ideias a embrião de sementes: uma experiência sobre a mobilização social em Fernando de Noronha* [Dissertação: Turismo, Universidade de Brasília]. from <https://repositorio.unb.br/handle/10482/14295>
- Cordeiro, I. (2016). *O turismo no processo de (re)produção de espaços insulares pela acumulação por despossessão - Fernando de Noronha* [Tese: Doutorado em Geografia, Universidade Federal de Pernambuco]. from <https://repositorio.ufpe.br/handle/123456789/23438>
- Cordeiro, I., Körössy, N., & Tôres, E. (2019). Análise do Processo de Turistificação de Fernando de Noronha (PE) entre os Anos de 1960 e 2016. *Revista Turismo Em Análise*, 29(1), 164–181. <https://doi.org/10.11606/issn.1984-4867.v29i1p164-181>
- Decreto 48.882 de 17 de março de 2020, (2020) (testimony of Pernambuco). from <https://legis.alepe.pe.gov.br/texto.aspx?tiponorma=6&numero=48822&complemento=0&ano=2020&tipo=&url=>
- Decreto 48.955 de 16 de abril de 2020, (2020) (testimony of Pernambuco). from <https://legis.alepe.pe.gov.br/texto.aspx?id=50172&tipo=>
- Diário de Pernambuco. (2020). *Fluxo turístico de Noronha cresce 39,37% em 5 anos*. Vida Urbana. from <https://www.diariodepernambuco.com.br/noticia/vidaurbana/2020/01/fluxo-turistico-de-noronha-cresce-39-37-em-5-anos.html>
- Dourado, M. L. (2020). *Coronavírus deve acelerar mudanças na vida e no turismo de Fernando de Noronha*. Turismo de Valor. from <https://jc.ne10.uol.com.br/colunas/turismo-de-valor/2020/04/5606312-coronavirus-deve-acelerar-mudancas-na-vida-e-no-turismo-de-fernando-de-noronha.html>
- Dwyer, L., & Forsyth, P. (1997). Measuring the benefits and yields from foreign tourism. *International Journal of Social Economics*, 24(1/2/3), 223–236. <https://doi.org/10.1108/03068299710161232>
- Dwyer, L., Forsyth, P., & Spurr, R. (2004). Evaluating tourism's economic effects: new and old approaches. *Tourism Management*, 25(3), 307–317. [https://doi.org/10.1016/S0261-5177\(03\)00131-6](https://doi.org/10.1016/S0261-5177(03)00131-6)
- Feitosa, M. J., & Gómez, C. R. (2013). Aplicação do Tourism Ecological Footprint Method para avaliação dos Impactos Ambientais do Turismo em Ilhas: um estudo em Fernando de Noronha. *Revista Brasileira de Pesquisa Em Turismo*, 7(2), 220–238. <https://doi.org/10.7784/rbtur.v7i2.509>
- Fernando de Noronha. (2013). *Hospital São Lucas*. Institucional. from http://www.noronha.pe.gov.br/institAdmin_2_2.php
- Fernando de Noronha. (2019). *Réveillon de Fernando de Noronha promete animar o público com vários ritmos musicais*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2350>
- Fernando de Noronha. (2020a). *Administração de Fernando de Noronha divulga programação do Carnaval*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2370>
- Fernando de Noronha. (2020b). *Administração de Noronha convida setor turístico da ilha para planejar reabertura pós Covid*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2457>
- Fernando de Noronha. (2020c). *Administração de Noronha finaliza hospital de campanha*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2430>
- Fernando de Noronha. (2020d). *Administração de Noronha libera o uso das praias com algumas recomendações*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2445
- Fernando de Noronha. (2020e). *Administração de Noronha planeja a volta dos moradores que estão no continente a partir do próximo sábado*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2456>
- Fernando de Noronha. (2020f). *Administrador de Fernando de Noronha faz balanço da gestão em 2019*. Acontece Em Noronha. <http://www.noronha.pe.gov.br/comAcontece.php?cod=2356>

- Fernando de Noronha. (2020g). *Auxílio de seguro desemprego começa a ser pago essa semana para os trabalhadores que foram demitidos em Noronha*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2447
- Fernando de Noronha. (2020h). *Bares, restaurantes e lanchonetes voltam a funcionar em Noronha com capacidade reduzida*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2459>
- Fernando de Noronha. (2020i). *Carnaval de Fernando de Noronha é marcado pela diversidade cultural*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2386>
- Fernando de Noronha. (2020j). *Fernando de Noronha completa um mês sem casos de Covid-19 e inicia estudo epidemiológico*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2444
- Fernando de Noronha. (2020k). *Fernando de Noronha determina quarentena de até 14 dias para quem chega do continente*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2401
- Fernando de Noronha. (2020l). *Fernando de Noronha oferece atendimento psicológico online aos moradores por causa da pandemia do Covid 19*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2414>
- Fernando de Noronha. (2020m). *Fernando de Noronha põe em ação plano de contingência para combate à Covid-19*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2403
- Fernando de Noronha. (2020n). *Fernando de Noronha sedia o Marands Surf Festival*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2394>
- Fernando de Noronha. (2020o). *Fernando de Noronha suspende temporariamente a entrada de moradores a partir do domingo*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2412
- Fernando de Noronha. (2020p). *Fernando de Noronha tem caso confirmado de Covid-19*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2405
- Fernando de Noronha. (2020r). *Governo de Pernambuco anuncia retomada do turismo em Noronha*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2477>
- Fernando de Noronha. (2020q). *Governo de Pernambuco decreta quarentena em Fernando de Noronha*. Acontece Em Noronha. from <http://www.noronha.pe.gov.br/comAcontece.php?cod=2423>
- Fernando de Noronha. (2020s). *Noronha inicia montagem de hospital de Campanha e higieniza aeroporto para prevenção do coronavírus*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2407
- Fernando de Noronha. (2020t). *Noronha zera casos de Covid-19 e estuda reabertura gradual da ilha*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2438
- Fernando de Noronha. (2020u). *Profissionais de saúde de Fernando de Noronha recebem treinamento sobre o coronavírus*. Acontece Em Noronha. from www.noronha.pe.gov.br/comAcontece.php?cod=2395
- Gössling, S., Scott, D., & Hall, C. M. (2020). *Pandemics, tourism and global change: a rapid assessment of COVID-19*. *Journal of Sustainable Tourism*, 1–20. from <https://doi.org/10.1080/09669582.2020.1758708>
- Governo de Pernambuco. (2016). *Fernando de Noronha: Manual do Operador*.
- Governo de Pernambuco. (2018). *Fluxo Turístico Mensal Fernando de Noronha (Anual 2018)*.
- Hampton, M., & Christensen, J. (2007). *Competing industries in islands: A new tourism approach*. *Annals of Tourism Research*, 34(4), 998–1020. <https://doi.org/10.1016/j.annals.2007.05.011>
- Hassan, R., Scholes, R., & Ash, N. (2005). *Ecosystems and human well-being: Current State and Trends*. In *Millennium ecosystem assessment (Vol.1)*. Island Press.
- Hua, J., & Shaw, R. (2020). *Corona Virus (COVID-19) “Infodemic” and Emerging Issues through a Data Lens: The Case of China*. *International Journal of Environmental Research and Public Health*, 17(7), 1–12. <https://doi.org/10.3390/ijerph17072309>

- IBAMA. (2004). *APA Fernando de Noronha - Rocas - São Pedro e São Paulo: Resumo Executivo*.
- IBAMA. (2005). *Plano de Manejo – Fase 1 da Área de Proteção Ambiental APA Fernando de Noronha, Atol das Rocas e São Pedro e São Paulo. Encarte 2: Análise Regional da Unidade de Conservação*.
- IBGE. (2020). *Fernando de Noronha*. Panorama. from <https://cidades.ibge.gov.br/brasil/pe/fernando-de-noronha/panorama>
- Körössy, N. (2007). *Turismo e recursos hídricos no arquipélago de Fernando de Noronha (Pernambuco/Brasil): Reflexões sobre a sustentabilidade da atividade turística a partir da análise do consumo de água pelos meios de hospedagem* [Dissertação: Mestrado em Gestão e Políticas Ambientais]. Universidade Federal de Pernambuco.
- Kokkranikal, J., McLellan, R., & Baum, T. (2003). Island Tourism and Sustainability: A Case Study of the Lakshadweep Islands. *Journal of Sustainable Tourism*, 11(5), 426–447. <https://doi.org/10.1080/09669580308667214>
- Lippi, G., Sanchis-Gomar, F., & Henry, B. M. (2020). Coronavirus disease 2019 (COVID-19): the portrait of a perfect storm. *Annals of Translational Medicine*, 8(7), 1–7. <https://doi.org/10.21037/atm.2020.03.157>
- Mandal, I., & Pal, S. (2020). COVID-19 pandemic persuaded lockdown effects on environment over stone quarrying and crushing areas. *Science of the Total Environment*, 732, 1–10. <https://doi.org/10.1016/j.scitotenv.2020.139281>
- Marinho, A. C. (2020a). *Administração de Fernando de Noronha adia eventos públicos por conta do cononavirus*. Blog Viver Noronha. from <https://g1.globo.com/pe/pernambuco/blog/viver-noronha/post/2020/03/15/administracao-de-fernando-de-noronha-adia-eventos-publicos-por-conta-do-cononavirus.ghtml>
- Marinho, A. C. (2020b). *Coronavirus : Parque Nacional de Noronha é fechado para visitantes e aeroporto deixará de receber turistas*. Blog Viver Noronha. from <https://g1.globo.com/pe/pernambuco/blog/viver-noronha/post/2020/03/17/parque-nacional-de-noronha-e-fechado-para-visitantes-por-cao-da-pandemia-do-novo-coronavirus.ghtml>
- Marinho, A. C. (2020c). *Fernando de Noronha anuncia nova cura clínica e volta a zerar casos da Covid-19*. Blog Viver Noronha. from <https://g1.globo.com/pe/pernambuco/blog/viver-noronha/post/2020/06/15/fernando-de-noronha-anuncia-nova-cura-clinica-e-volta-a-zerar-casos-da-covid-19.ghtml>
- Marinho, A. C. (2020d). *Horário limitado em praias de Noronha é ação de prevenção para evitar incidentes com tubarões*. Blog Viver Noronha. from <https://g1.globo.com/pe/pernambuco/blog/viver-noronha/post/2020/05/26/horario-limitado-em-praias-de-noronha-e-acao-de-prevencao-para-evitar-incidentes-com-tubaroes.ghtml>
- Marinho, A. C. (2020e). *Moradores irregulares são retirados de Fernando de Noronha*. Blog Viver Noronha. from <https://g1.globo.com/pe/pernambuco/blog/viver-noronha/post/2020/04/02/moradores-irregulares-sao-retirados-de-fernando-de-noronha.ghtml>
- Marinho, A. C. (2020f). *Noronha tem diminuição na oferta de frutas e verduras*. Blog Viver Noronha. from <https://g1.globo.com/pe/pernambuco/blog/viver-noronha/post/2020/04/10/fernando-de-noronha-tem-diminuicao-na-oferta-de-frutas-e-verduras.ghtml>
- Marinho, A. C. (2020g). *Administração de Noronha autoriza voos semanais e retorno de mais de moradores*. Blog Viver Noronha. from <https://g1.globo.com/pe/pernambuco/blog/viver-noronha/post/2020/06/29/administracao-de-noronha-autoriza-voos-semanais-e-retorno-de-mais-de-moradores.ghtml>
- Marques, B., Logossah, K., & Carpin, E. (2003). *L'impact du tourisme à la Martinique*. Institut National Da La Statistique et Des Études Économiques. From http://insee.fr/fr/themes/document.asp?reg_id=23&ref_id=10742
- OECD. (2020). *The global outlook is highly uncertain*. Economic Outlook. from <http://oecd.org/economic-outlook>
- Pernambuco. (1989). Lei Nº 10.403, de 29 de dezembro de 1989. *Diário Oficial Do Estado de Pernambuco*. from https://www.sefaz.pe.gov.br/Legislacao/Tributaria/Documents/legislacao/Leis_Tributarias/1989/Lei10403_89.htm

- Pernambuco. (2020a). *Lei Orçamentária anual 2020*. from <http://web.transparencia.pe.gov.br/planejamento-orcamento/lei-orcamentaria-anual-loa/>
- Pernambuco. (2020b). *Portal da Transparência do Governo do Estado de Pernambuco. Receitas. Painel de Receitas. Autarquia Territorial Distrito Estadual de Fernando de Noronha*. from <http://web.transparencia.pe.gov.br/receitas/painel-de-receitas/>
- Pernambuco. (2020c). *Portaria 208 de 9 de junho de 2020*. from <https://www.legisweb.com.br/legislacao/?id=396696>
- Petchenik, I. (2020a). *Aviations slow recovery: May air traffic statistics*. Flight Radar 24. from <https://www.flightradar24.com/blog/aviations-slow-recovery-may-air-traffic-statistics/>
- Petchenik, I. (2020b). *Commercial air traffic now down 7.2% in March*. Flight Radar 24. from <https://www.flightradar24.com/blog/commercial-air-traffic-now-down-7-2-in-march/>
- Petchenik, I. (2020c). *Flight activity rises in June, still far below 2019 levels*. Flight Radar 24. from <https://www.flightradar24.com/blog/flight-activity-rises-in-june-still-far-below-2019-levels/>
- Pololikashvili, Z. (2020). *COVID-19 Statement [Secretary General Statement]*. from <https://www.unwto.org/news/covid-19-statement-zurab-pololikashvili>
- Rocha, J. M., & Brasileiro, I. L. (2013). *Turismo em Fernando de Noronha – Uma visão de sustentabilidade a partir do estruturalismo*. *Revista Cenário*, 1(1), 74–92. <https://doi.org/10.26512/revista-cenario.v1i1.15210>
- Rufai, S. R., & Bunce, C. (2020). *World leaders' usage of Twitter in response to the COVID-19 pandemic: a content analysis*. *Journal of Public Health*, 1–7. <https://doi.org/10.1093/pubmed/fdaa049>
- SEPLAG. (2020). *Nova classificação da receita pública*. Secretaria Executiva de Planejamento, Orçamento e Captação. from <https://www.seplag.pe.gov.br/secretarias/38-secretaria/27-sepoc>
- Shalders, A. (2020). *Mandetta é demitido do Ministério da Saúde após um mês de conflito com Bolsonaro: relembre os principais choques*. BBC News Brasil. from <https://www.bbc.com/portuguese/internacional-52316728>
- Sousa, R. (2006). *A sustentabilidade do destino turístico Porto Santo [Dissertação: Mestrado em Gestão Estratégica e Desenvolvimento do Turismo]*. Universidade da Madeira.
- Souza, G. M., & Vieira Filho, N. Q. (2011). *Impactos socioculturais do turismo em comunidades insulares: um estudo de caso no arquipélago de Fernando de Noronha-PE*. *Observatório de Inovação Do Turismo*, 6(4), 1–18. <https://doi.org/10.12660/oit.v0n4.5805>
- Tokyo 2020. (2020). *Olympic Games postponed to 2021*. News. from <https://tokyo2020.org/en/news/joint-statement-from-international-olympic-committee-and-tokyo2020>
- UNWTO. (2004). *No Making Tourism Work for Small Island Developing States*.
- UNWTO. (2020a). *100% of global destinations now have Covid-19 travel restrictions*. News. from <https://www.unwto.org/news/covid-19-travel-restrictions>
- UNWTO. (2020b). *International tourist numbers could fall 60-80% in 2020*. from <https://www.unwto.org/news/covid-19-international-tourist-numbers-could-fall-60-80-in-2020>
- UNWTO. (2020c). *Stay healthy. Travel responsibly*. <https://www.unwto.org/health-advice-for-tourists>
- UNWTO. (2020d). *UNWTO World Tourism Barometer May 2020: Special focus on the Impact of COVID-19*. <https://doi.org/10.18111/9789284421817>
- UNWTO. (2020e). *Tourism in SIDS: the challenge of sustaining livelihoods in times of COVID-19*. from <https://www.e-unwto.org/doi/pdf/10.18111/9789284421916>
- UNWTO, & UNEP. (2000). *The Hainan Declaration. UNWTO Declarations | Déclarations de l'OMT | Declaraciones de La OMT*, 10(2), 1–4. <https://doi.org/10.18111/unwtodeclarations.2000.10.02>
- Vaughan, A. (2020). *Environmental effects*. *New Scientist*, 10–11. [https://doi.org/10.1016/S0262-4079\(20\)30661-8](https://doi.org/10.1016/S0262-4079(20)30661-8)
- Vellingiri, B., Jayaramayya, K., Iyer, M., Narayanasamy, A., Govindasamy, V., Giridharan, B., Ganesan, S., Venugopal, A., Venkatesan, D., Ganesan, H., Rajagopalan, K., Rahman, P. K. S. M., Cho, S. G., Kumar, N. S., & Subramaniam, M. D. (2020). *COVID-19: A promising cure for the global panic*. *Science of the Total Environment*, 725, 1–18. <https://doi.org/10.1016/j.scitotenv.2020.138277>

- Verelst, F., Kuylen, E., & Beutels, P. (2020). Indications for healthcare surge capacity in European countries facing an exponential increase in coronavirus disease (COVID-19) cases, March 2020. *Eurosurveillance*, 25(13), 1–4. <https://doi.org/10.2807/1560-7917.ES.2020.25.13.2000323>
- Vivas, L. B. (2012). Turismo e desenvolvimento social no Caribe: O lugar do outro. *Revista Iberoamericana de Turismo*, 2(2), 74–88. from <http://www.seer.ufal.br/index.php/ritur>
- WHO. (2020a). #China has reported to WHO a cluster of #pneumonia cases –with no deaths– in Wuhan, Hubei Province. Investigations are underway to identify the cause of this illness. [Twitter: @WHO]. from <https://twitter.com/WHO/status/1213523866703814656>
- WHO. (2020b). Advice on the use of masks in the context of COVID-19. from [https://www.who.int/publications/i/item/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications/i/item/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak)
- WHO. (2020c). *Coronavirus disease 2019* (Vol. 71). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200331-sitrep-71-covid-19.pdf?sfvrsn=4360e92b_8
- WHO. (2020d). *Coronavirus Disease 2019* (Vol. 56). from <https://doi.org/10.1213/xa.0000000000001218>
- WHO. (2020e). *Coronavirus Disease 2019* (Vol. 51). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10
- WHO. (2020f). *Coronavirus Disease 2019* (Vol. 57). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200317-sitrep-57-covid-19.pdf?sfvrsn=a26922f2_4
- WHO. (2020g). *Coronavirus Disease 2019* (Vol. 73). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf?sfvrsn=5ae25bc7_6
- WHO. (2020h). *Coronavirus Disease 2019* (Vol. 80). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200409-sitrep-80-covid-19.pdf?sfvrsn=1b685d64_6
- WHO. (2020i). *Coronavirus Disease 2019* (Vol. 123). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200522-covid-19-sitrep-123.pdf?sfvrsn=5ad1bc3_4
- WHO. (2020j). *Coronavirus Disease 2019* (Vol. 125). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200524-covid-19-sitrep-125.pdf?sfvrsn=80e7d7f0_2
- WHO. (2020k). *Coronavirus Disease 2019* (Vol. 128). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200527-covid-19-sitrep-128.pdf?sfvrsn=11720c0a_2
- WHO. (2020l). *Coronavirus Disease 2019* (Vol. 147). from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200615-covid-19-sitrep-147.pdf?sfvrsn=2497a605_4
- WHO. (2020m). *Emergencies preparedness, response Pneumonia of unknown cause – China*. from <https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/>
- WHO. (2020n). *Mission summary: WHO Field Visit to Wuhan*. from <https://www.who.int/china/news/detail/22-01-2020-field-visit-wuhan-china-jan-2020>
- WHO. (2020o). *Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV)*. from [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov))
- WHO. (2020p). *WHO Director General’s remarks at the G20 Extraordinary Leaders’ Summit on COVID-19 - 26 March 2020*. from <https://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-g20-extraordinary-leaders-summit-on-covid-19--26-march-2020>
- WHO. (2020q). *WHO statement on novel coronavirus in Thailand*. from <https://www.who.int/news-room/detail/13-01-2020-who-statement-on-novel-coronavirus-in-thailand>
- WTTC. (2020). *Latest research from WTTC shows a 50% increase in jobs at risk in Travel & Tourism*.
- Zambrano-Monserrate, M. A., Ruano, M. A., & Sanchez-Alcalde, L. (2020). Indirect effects of COVID-19 on the environment. *Science of the Total Environment*, 728, 138813. <https://doi.org/10.1016/j.scitotenv.2020.138813>

Zarinato, S. H., & Tomazzoni, E. L. (2014). A sustentabilidade do turismo em Fernando de Noronha (PE-Brazil). *Turydes: Turismo y Desarrollo*, 7(17), 1–24. from <http://www.eumed.net/rev/turydes/17/noronha.html>.

Informations about the authors

Wilma Barros da Paixão

She has a Bachelor degree in Biomedical Engineering (UFPE). She is currently enrolled in the Bachelor of Tourism Program (UFPE) as well as in the Graduate Program in Development and the Environment (PRODEMA) at the Federal University of Pernambuco (UFPE).

Contributions: literature review, data collection, data analysis, discussion of results.

Email: wilmabarros@gmail.com

ORCID: <https://orcid.org/0000-0003-2385-0297>

Itamar José Dias e Cordeiro

He is an Adjunct Professor at the Federal University of Pernambuco (UFPE). He is a Professor at the Department of Hotel Management and Tourism (DHT-UFPE) and at the Graduate Program in Development and Environment (PRODEMA-UFPE).

Contributions: research conception, literature review, data analysis, discussion of results.

Email: itamar_cordeiro@yahoo.com.br

ORCID: <https://orcid.org/0000-0002-9501-5103>

Nathália Körössy Leite

She is an Adjunct Professor at the Federal University of Pernambuco (UFPE). She is a Professor at the Department of Hotel Management and Tourism (DHT-UFPE) and at the Graduate Program in Hotel Management and Tourism (PPHTUR-UFPE).

Contributions: data analysis, discussion of results.

Email: nathaliakorossy@gmail.com

ORCID: <https://orcid.org/0000-0002-0566-2500>